(1390 REV. 5-93) US DEPT. OF COMMERCE PATENT & TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER
105895

U.S. APPLICATION NO.
(if known, sec 37 C.F.R.1.5)
09/509669

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/JP99/03927	July 22, 1999	August 5, 1998

TITLE OF INVENTION
OPTICAL MODULE

APPLICANT(S) FOR DO/EO/US
Akihiro MURATA and Shojiro KITAMURA

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.

2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.

3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).

4. ☐ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.

5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☒ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)

6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).

7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☐ have not been made and will not be made.

8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).

9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).

10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.

12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.

13. ☒ A FIRST preliminary amendment.

    ☐ A SECOND or SUBSEQUENT preliminary amendment.

14. ☐ A substitute specification.

15. ☐ A small entity statement.

16. ☐ Other items or information:

U.S. APPLICATION NO. (if known, see 37 C.F.R. 1.5) 09/509669	INTERNATIONAL APPLICATION NO. PCT/JP99/03927	ATTORNEY'S DOCKET NUMBER 105895

17. ☐ The following fees are submitted:	CALCULATIONS	PTO USE ONLY
Basic National fee (37 CFR 1.492(a)(1)-(5)):		
Search Report has been prepared by the EPO or JPO.....$840.00		
International preliminary examination fee paid to USPTO (37 CFR1.482).....$670.00		
No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)).....$690.00		
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO.....$970.00		
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4).....$ 96.00		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$840	
Surcharge of $130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$	

Claims	Number Filed	Number Extra	Rate		
Total Claims	18 - 20 =	0	X $ 18.00	$	
Independent Claims	4 - 3 =	1	X $ 78.00	$78	
Multiple dependent claim(s)(if applicable)			+ $260.00	$	
TOTAL OF ABOVE CALCULATIONS =				$78	
Reduction by 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed. (Note 37 CFR 1.9, 1.27, 1.28). -				$	
SUBTOTAL =				$918	
Processing fee of $130.00 for furnishing the English translation later than ☐ 20 ☐ 30 month from the earliest claimed priority date (37 CFR 1.492(f)). +				$	
TOTAL NATIONAL FEE =				$918	
				Amount to be refunded	$
				Charged	$

a. ☒ Check No. 107519 in the amount of $918 to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of $_____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Director is hereby authorized to charge any additional fees which may be required, or credit any overpayment, to Deposit Account No. 15-0461. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:
OLIFF & BERRIDGE, PLC
P.O. Box 19928
Alexandria, Virginia 22320

NAME: James A. Oliff
REGISTRATION NUMBER: 27,075

NAME: Joel S. Armstrong
REGISTRATION NUMBER: 36,430

(1390 Rev.8-93)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Akihiro MURATA and Shojiro KITAMURA

Application No.: U.S. National Stage of
PCT/JP99/03927

Filed: March 31, 2000 Docket No.: 105895

For: OPTICAL MODULE

PRELIMINARY AMENDMENT

Director of the U.S. Patent and Trademark Office
Washington, D. C. 20231

Sir:

Prior to initial examination, please amend the above-identified application as follows:

IN THE CLAIMS:

Please amend claim 16 as follows:

Claim 16, lines 1 and 2, change "any one of claims 4 to 15" to--claim 4--.

REMARKS

Claims 1-18 are pending. By this Preliminary Amendment, claim 16 is amended to eliminate a multiple dependency. Prompt and favorable examination on the merits is respectfully solicited.

Respectfully submitted,

James A. Oliff
Registration No. 27,075

Joel S. Armstrong
Registration No. 36,430

JAO:JSA/emb

OLIFF & BERRIDGE, PLC
P.O. Box 19928
Alexandria, Virginia 22320
Telephone: (703) 836-6400

OPTICAL MODULE

TECHNICAL FIELD

The present invention relates to an optical module which is formed by integrating an optical element, optical waveguide, or the like.

BACKGROUND ART

An optical module is a transducer from electrical energy to light, or from light to electrical energy. An optical module is constituted in hybrid integrated form by an optical element, an optical waveguide, an electrical circuit, and the like. An optical module is used, for example, in an optical fiber communications system.

Fig. 3 shows schematically the disposition of an optical waveguide and optical element in a conventional optical module. This is disclosed in the journal *Optical Technology Contact* Vol. 36, No. 4 (1998). On a principal surface of a mounting substrate 40, a depression 42 is provided. In the depression 42 is mounted an optical element 44. On the principal surface of the mounting substrate 40 is fitted an optical waveguide 46. The end portion 48 of the optical waveguide 46 is positioned over the optical element 44. The end portion 48 forms a mirror. Light 50 emitted by the optical element 44 is reflected by the end portion 48, and enters the core 52 of the optical waveguide 46. The light 50 proceeds in the direction shown

by an arrow within the core 52, and is transmitted through the optical fiber or the like.

However, this requires both alignment accuracy when mounting the optical element on the mounting substrate and alignment accuracy between the mounting substrate on which the optical element is mounted and the optical waveguide. In particular, for an optical module such as an optical fiber requiring positioning accuracy with an error of ±1 to ±5 μm, there is also a requirement to reduce as far as possible the number of locations at which this alignment accuracy is required.

Further, electronic instruments are required to be more compact and lightweight, as a result of which, compactness, light weight, and low cost are requirements for optical modules.

This invention solves this problem. The objective of this invention is the provision of an optical module which can be made more compact and lightweight.

DISCLOSURE OF THE INVENTION

(1) An optical module of this invention comprises:

a mounting member having a principal surface; an interconnect formed on the mounting member; and an optical element mounted on the principal surface and electrically connected to the interconnect,

wherein the mounting member is an optical waveguide for guiding light emitted from the optical element or light

admitted to the optical element.

In a conventional optical module, on a mounting member is mounted an optical waveguide separate from the mounting member. In contradistinction, this invention has the mounting member and optical waveguide as an integral member. The optical module can therefore be made thinner. As a result, the optical module can be made more compact and lightweight.

In a conventional optical module, there are three members involved in the positioning: the mounting member, the optical waveguide, and the optical element. On the other hand, in this invention there are two: the mounting member (optical waveguide) and the optical element. Therefore, in this invention, the optical element positioning is made easier, and the bonding accuracy can be improved.

A light-admitting aperture or light-emitting aperture of the optical element may be disposed opposing the principal surface. Such an optical element may be, for example, a surface-emission laser.

A light-reflecting member may be provided on the optical waveguide. Through the light-reflecting member, light can be transmitted between the optical element and the optical waveguide.

(2) An optical module of this invention comprises: an optical element for emitting or admitting light; and an optical waveguide having a principal surface, with the

optical element mounted on the principal surface, for guiding light emitted from the optical element or light admitted to the optical element.

This aspect of the invention has the same effect as the aspect (1) of the invention.

The optical element and the optical waveguide may be fixed with an adhesive member having light transmitting characteristics interposed between the optical element and the optical waveguide in such a way that the position of emission or admission of light of the optical element opposes the optical waveguide, and be subjected to bare chip mounting.

Bare chip mounting allows more compact and lightweight design than with package mounting. In this aspect, since the optical element is subjected to bare chip mounting, the optical module can be made more compact and lightweight. The optical element and optical waveguide and are fixed by an adhesive member having light transmitting characteristics. By virtue of this, the optical element and the optical waveguide can be fixed and an optical path between the optical element and the optical waveguide can be assured.

The optical waveguide may have a modifying portion whereby the direction of progress of the light is changed; and the optical element may be positioned to overlie the modifying portion. By virtue of this, the direction of progress of the light can be efficiently changed.

The modifying portion is formed in the optical waveguide, and the optical element is directly mounted to the optical waveguide having the modifying portion. By virtue of this, the relative positioning (distance and the like) of the optical element and modifying portion can always be maintained constant, as a result of which there can be no loss of focus with respect to the modifying portion. On the other hand, in the prior art, the optical element is not mounted directly on the optical waveguide, and therefore the optical waveguide and optical element are disposed separated from each other. For this reason, when both are fixed with respect to other elements, there is a possibility of relative movement between the two. Therefore, even if the positioning operation is achieved, thereafter there is the possibility of a change in the positioning caused by various influences (heat, external pressure, and the like).

It should be noted that in the expression "positioned to overlie the modifying portion," the term "overlie" indicates that when seen projected from the optical element or modifying portion, both are disposed in positions such that it appears that both coincide.

On the principal surface of the optical waveguide may be further mounted a semiconductor element in addition to the optical element, and the optical element and the semiconductor element may be integrally sealed with a resin.

If the optical element and semiconductor element are

mounted on the principal surface of the optical waveguide, the interconnect connecting the two may be made shorted. The formation of the interconnect on the mounting substrate can be single layer, and the interconnect formation is made easier. If the optical element and semiconductor element are integrally sealed with a resin, the strength of the optical module can be improved. If the optical element and semiconductor element are hybrid, the degree of integration of the optical module can be improved. By the improvement of this degree of integration, the cost can be lowered.

The resin may have light blocking characteristics. If light impinges on the semiconductor element, faulty operation of the semiconductor element is possible. By sealing the semiconductor element with a resin having light blocking characteristics, faulty operation can be prevented.

The semiconductor element may have a function of driving the optical element.

Since the optical element and the semiconductor element driving or controlling the optical element are mounted on the principal surface of the optical waveguide, the optical module can be made a module of high added value. A higher degree of integration of the optical module and a lower cost can also be achieved.

A circuit may be laminated directly on the principal surface of the optical waveguide. If a circuit is laminated directly on the principal surface of the optical waveguide, the mounting of the semiconductor element is not required.

Therefore, it is no longer necessary to consider the reliability of connection between different components. In respect of connections between integrated circuit elements, the connections can be eliminated, and by virtue of this, the interconnect impedance characteristics and noise characteristics can be improved, while the effect of delays can be held to a minimum. The degree of integration on the principal surface of the optical waveguide can be improved, and a high degree of integration of the optical module and low cost can be achieved.

(3) An optical module of the invention comprises: an optical element; and a mounting member which has a function of an optical waveguide for guiding light emitted from the optical element or light admitted to the optical element and is electrically connected to the optical element or a semiconductor element associated therewith.

This aspect of the invention has the same effect as the aspect (1) of the invention.

(4) An optical module of this invention comprises: a mounting member having a principal surface and a lateral surface; and an optical element mounted on the principal surface, wherein the mounting member has a function of an optical waveguide, and an optical input/output terminal for the optical waveguide is provided on the lateral surface of the mounting member.

This aspect of the invention has the same effect as the aspect (1) of the invention. It should be noted that an

optical input/output terminal means a terminal at which light is input, or a terminal at which light is output, or a terminal at which light is input and/or output.

It should be noted that optical elements include both elements which emit light and elements which receive light. The mounting member may be in plate, film, or other form, as long as it allows the optical element to be mounted.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows a schematic cross-section of one embodiment of the optical module of this invention;

Fig. 2 shows a schematic plan view of one embodiment of the optical module of this invention; and

Fig. 3 shows schematically the relative disposition of the optical waveguide and optical element of a conventional optical module.

BEST MODE FOR CARRYING OUT THE INVENTION

Structure

Fig. 1 shows a schematic cross-section of one embodiment of the optical module of this invention. Fig. 2 shows a schematic plan view thereof. A glass mounting substrate 10 doubles as an optical waveguide. Thus, within the mounting substrate 10 are formed a core 12 and cladding 14 extending along the surface for mounting an optical element on the mounting substrate 10. The core 12 and cladding 14 are formed within the mounting substrate 10 by

using thin-film formation techniques, photolithography, or the like.

One end portion 18 of the optical waveguide forms a 45-degree mirror by which the light is bent through 90 degrees. The 45-degree mirror is formed by using for example a 90-degree V-shape diamond saw, to machine the end portion 18 of the optical waveguide. On the lateral surface of the mounting substrate 10, and at the other end portion of the optical waveguide, is disposed an optical output terminal 29. Light passes along the core 12, and is output from the optical output terminal 29.

On the mounting substrate 10, interconnects 16a, 16b, and 16c are formed from a metal foil or the like. In this embodiment, the interconnects 16a, 16b, and 16c are formed on the principal surface of the mounting substrate 10, but these may equally be formed on a lateral surface of the mounting substrate 10. Alternatively, interconnects may be formed on the surface opposite to the principal surface of the mounting substrate 10 (the rear surface), and may be electrically connected to the principal surface through through holes or the like formed in the mounting substrate 10. Instead, the interconnects may be formed on any two or all of the principal surface, a lateral surface and the rear surface of the mounting substrate 10. It should be noted that the largest surface of the mounting substrate 10 is commonly the principal surface, but even if not the largest surface, the surface on which it is possible to

mount the optical element is the principal surface.

A semiconductor chip 20 is electrically connected by the flip-chip bonding to the interconnects 16a and 16c. That is to say, metal bumps are formed on the electrodes of the semiconductor chip 20, and the semiconductor chip 20 is connected to the mounting substrate 10 forming the interconnect substrate by the face-down bonding. The semiconductor chip 20 has a CMOS circuit, for example. The interconnect 16c forms an electrical input/output terminal. In this embodiment, one semiconductor chip 20 is fitted, but a plurality of semiconductor chips 20 may be fitted. For example, a plurality of semiconductor chips 20 may be fitted corresponding to a plurality of optical elements.

A surface-emission laser 22 is electrically connected to an interconnect 16b by the flip-chip bonding. On one surface of the surface-emission laser 22 is formed an electrode 24. On the other surface are formed electrodes 26 and a light-emitting aperture 28. The surface-emission laser 22 is disposed on the principal surface of the mounting substrate 10 so that light emitted from the aperture 28 is reflected by the end portion 18, to pass along the core 12. The electrodes 26 and interconnect 16b are electrically connected. The emitting aperture 28 and electrodes 26 are sealed with a transparent resin 34 having light transmitting characteristics. The transparent resin 34 is a silicone resin having light transmitting characteristics. The electrode 24 is electrically connected

to the interconnect 16a by a wire 30. In this embodiment, a plurality of surface-emission lasers 22 are provided as an example of a plurality of optical elements, but the present invention is not limited to this. For example, a single optical element may be provided, and this optical element may have a plurality of light-admitting apertures or light-emitting apertures. Naturally, a single optical element with a single light-admitting aperture or light-emitting aperture may also be provided.

The semiconductor chip 20 and surface-emission laser 22 are sealed with a resin 36 having light blocking characteristics. However, the resin 36 is provided in such a way as not to impede the passage of light between the optical element (for example, the surface-emission laser 22) and the optical waveguide (for example the core 12). The resin 36 is an epoxy resin. The components of the epoxy resin are from 10 to 50 per cent epoxy and from 90 to 50 per cent filler (silica or the like). In this embodiment, three optical waveguides are aligned in parallel. That is to say, the three cores 12 forming the three optical waveguides are formed within the mounting substrate 10. Moreover, the three cores 12 (optical waveguides) are disposed in parallel, and the optical output terminal 29 of each of their cores 12 (optical waveguides) are formed on the same lateral surface of the mounting substrate 10. The three surface-emission lasers 22 connected to the optical waveguides are mounted on the mounting substrate 10 at the

end distant from the optical output terminals 29.

Operation

Electrical signals from the semiconductor chip 20 are transferred to the surface-emission laser 22. By this means, the surface-emission laser 22 emits light 32. The light 32 is emitted from the emitting aperture 28, and at the end portion 18 of the optical waveguide is reflected through 90 degrees. Then it proceeds along the center of the core 12 in the direction of the arrow, and is transmitted through the optical output terminal 29 to an optical fiber or the like.

Effect

In this embodiment, the mounting substrate 10 doubles as an optical waveguide. Therefore, the optical module can be made thinner. As a result, the optical module can be made more compact and lightweight.

In this embodiment, when aligning the optical waveguide and surface-emission laser 22, there are two items involved in the positioning: the mounting substrate 10 (optical waveguide) and the surface-emission laser 22. Thus the bonding of the surface-emission laser and the optical waveguide which conventionally was complicated and time-consuming is simplified, and the bonding strength can also be improved. Additionally, the costs associated with bonding can be reduced.

Other matters

In this embodiment, the direction of the light is changed by a 45-degree mirror. However, this is not limitative of the invention, and this any other component appropriate for changing the direction of the light may be applied in the invention.

In this embodiment, the direction of the light is changed at the end portion of the waveguide. However, this is not limitative of the invention, and the direction of the light may be changed at a portion other than the end portion of the waveguide.

In this embodiment, the surface-emission laser 22 must inject light into the optical waveguide, and therefore the mounting position of the surface-emission laser 22 is restricted. However, the semiconductor chip 20 can be mounted anywhere as long as it is on the principal surface of the mounting substrate 10.

In this embodiment, the surface-emission laser 22 and semiconductor chip 20 are mounted on the mounting substrate 10 by the flip-chip bonding. However, this is not limitative of the invention, and the surface-emission laser 22 or semiconductor chip 20 may equally be mounted by face-up bonding or the like.

In this embodiment, the semiconductor chip 20 is mounted on the mounting substrate 10. However, this is not limitative of the invention, and on the principal surface

of the mounting substrate 10 may be formed a circuit of thin-film transistors, which may be used in place of the semiconductor chip 20. Alternatively, with such a thin-film transistor circuit and the semiconductor chip 20 may be formed a circuit to send signals to the surface-emission laser 22.

In this embodiment, the mounting substrate 10 is made of glass. However, this is not limitative of the invention, and a polymer or suchlike film may be used for the mounting substrate 10.

In this embodiment, the surface-emission laser 22 constitutes an optical element. However, this is not limitative of the invention, and a laser diode, photodiode, or other optical element may equally be used.

CLAIMS

1. An optical module comprising:

a mounting member having a principal surface;

an interconnect formed on said mounting member; and

an optical element mounted on said principal surface and electrically connected to said interconnect,

wherein said mounting member is an optical waveguide for guiding light emitted from said optical element or light admitted to said optical element.

2. The optical module as defined in claim 1,

wherein a light-admitting aperture or light-emitting aperture of said optical element is disposed opposing said principal surface.

3. The optical module as defined in claim 2,

wherein a light-reflecting member is provided on said optical waveguide; and

wherein light is transmitted between said optical element and said optical waveguide through said light-reflecting member.

4. An optical module comprising:

an optical element for emitting or admitting light; and

an optical waveguide having a principal surface, with

said optical element mounted on said principal surface, for guiding light emitted from said optical element or light admitted to said optical element.

5. The optical module as defined in claim 4,

wherein said optical element and said optical waveguide are fixed with an adhesive member having light transmitting characteristics interposed between said optical element and said optical waveguide in such a way that the position of emission or admission of light of said optical element opposes said optical waveguide, and are subjected to bare chip mounting.

6. The optical module as defined in claim 5,

wherein said optical waveguide has a modifying portion whereby the direction of progress of said light is changed; and

wherein said optical element is positioned to overlie said modifying portion.

7. The optical module as defined in claim 4,

wherein a semiconductor element is further mounted on said principal surface in addition to said optical element; and

wherein said optical element and said semiconductor element are integrally sealed with a resin.

8. The optical module as defined in claim 5,

wherein a semiconductor element is further mounted on said principal surface in addition to said optical element; and

wherein said optical element and said semiconductor element are integrally sealed with a resin.

9. The optical module as defined in claim 6,

wherein a semiconductor element is further mounted on said principal surface in addition to said optical element; and

wherein said optical element and said semiconductor element are integrally sealed with a resin.

10. The optical module as defined in claim 7, wherein said resin has light blocking characteristics.

11. The optical module as defined in claim 8, wherein said resin has light blocking characteristics.

12. The optical module as defined in claim 9, wherein said resin has light blocking characteristics.

13. The optical module as defined in claim 7, wherein said semiconductor element has a function of driving said optical element.

14. The optical module as defined in claim 8, wherein said semiconductor element has a function of driving said optical element.

15. The optical module as defined in claim 9, wherein said semiconductor element has a function of driving said optical element.

16. The optical module as defined in any of claims 4 to 15, wherein a circuit is laminated directly on said principal surface.

17. An optical module comprising:

an optical element; and

a mounting member which has a function of an optical waveguide for guiding light emitted from said optical element or light admitted to said optical element and is electrically connected to said optical element or a semiconductor element associated with said optical element.

18. An optical module comprising:

a mounting member having a principal surface and a lateral surface; and

an optical element mounted on said principal surface,

wherein said mounting member has a function of an optical waveguide, and an optical input/output terminal for said optical waveguide is provided on said lateral surface.

ABSTRACT

An optical module which can be made more compact and lightweight. An end portion (18) of a mounting substrate (10) forms a mirror which reflects light through 90 degrees. A surface-emission laser (22) is disposed so that a light-emitting aperture (28) faces the end portion (18). Within the mounting substrate (10) are formed a core (12) extending along the plane of the mounting substrate (10) and a cladding (14). The mounting substrate (10) doubles as an optical waveguide. Therefore, the optical module can be made thinner. As a result, the optical module can be made more compact and lightweight.

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Akihiro MURATA and Shojiro KITAMURA

Application No.: U.S. National Stage of PCT/JP99/03927

Filed: March 31, 2000 Docket No.: 105895

For: OPTICAL MODULE

REQUEST FOR APPROVAL OF DRAWING CORRECTION

Director of the U.S. Patent and Trademark Office
Washington, D.C. 20231

Sir:

The Examiner is requested to review and approve the proposed correction to Figure 3, marked in red on the attached copy of such drawing figure.

Upon approval by the Examiner, and upon allowance of this application, the formal drawings will be corrected.

Respectfully submitted,

James A. Oliff
Registration No. 27,075

Joel S. Armstrong
Registration No. 36,430

JAO:JSA/emb

OLIFF & BERRIDGE, PLC
P.O. Box 19928
Alexandria, Virginia 22320
Telephone: (703) 836-6400

Proposed Amendment

Epus-1966 1/
09/509669

FIG. 2

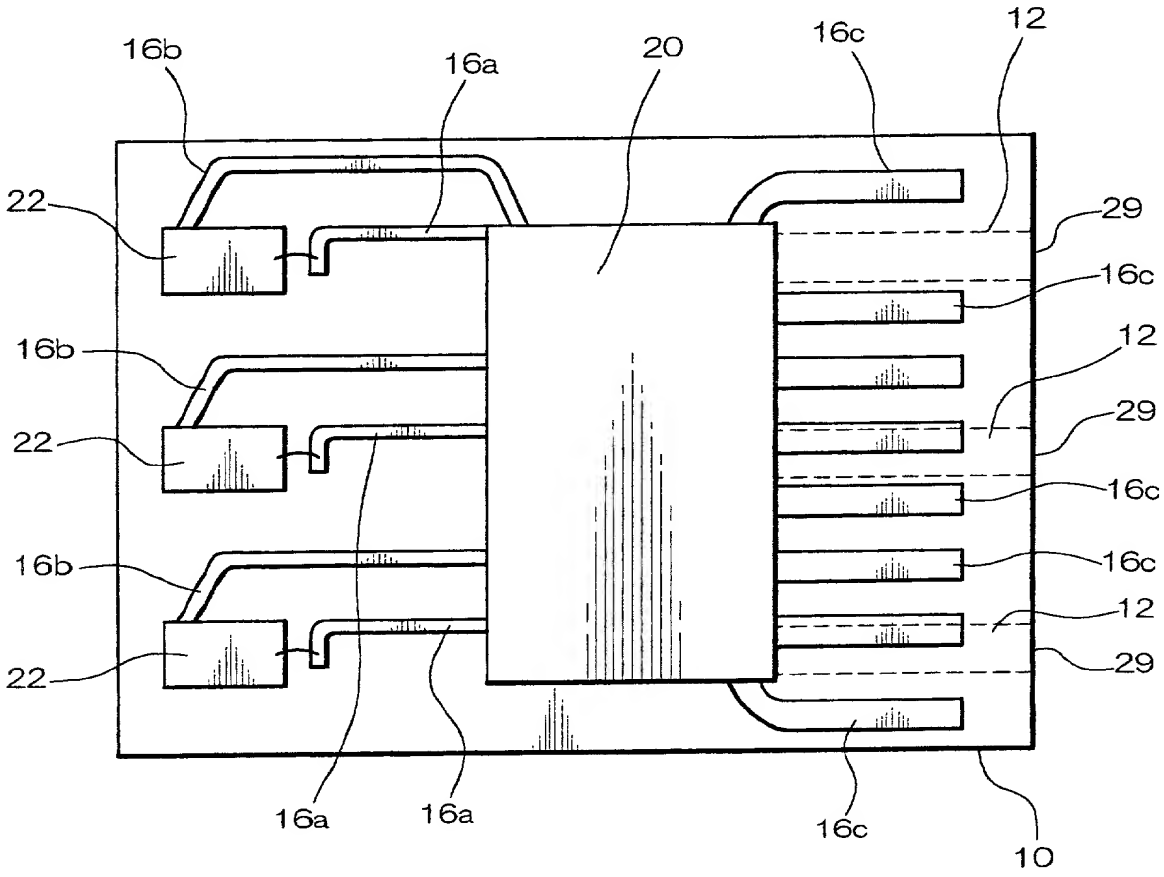

FIG. 3

PRIOR ART

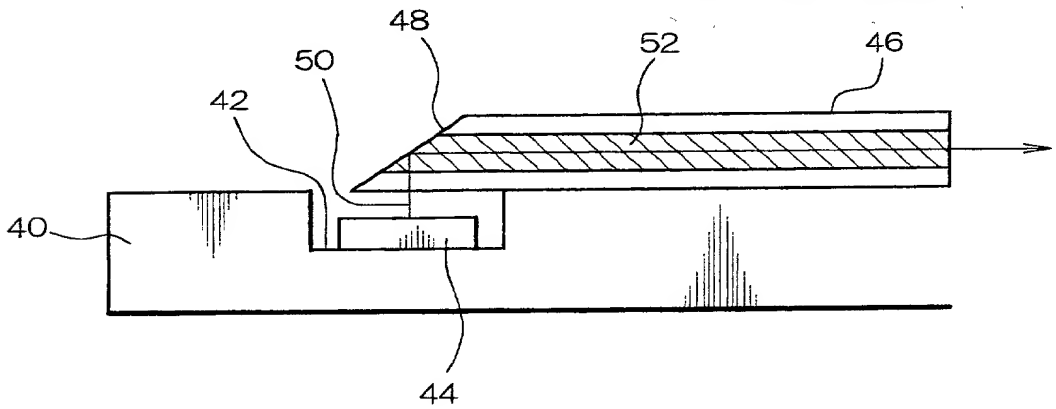

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FIG. 1

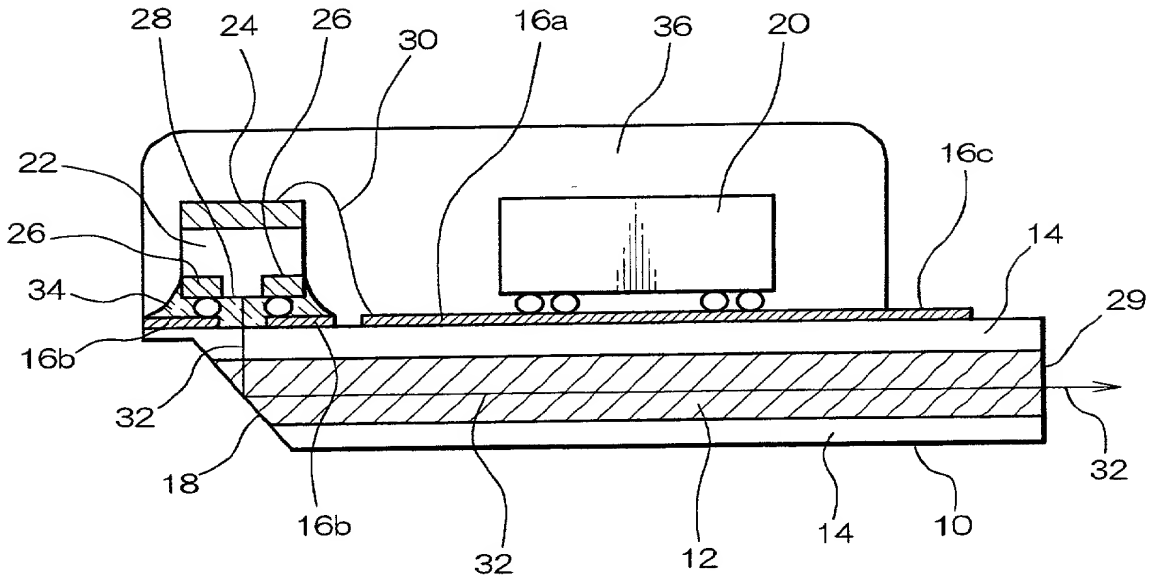

FIG. 2

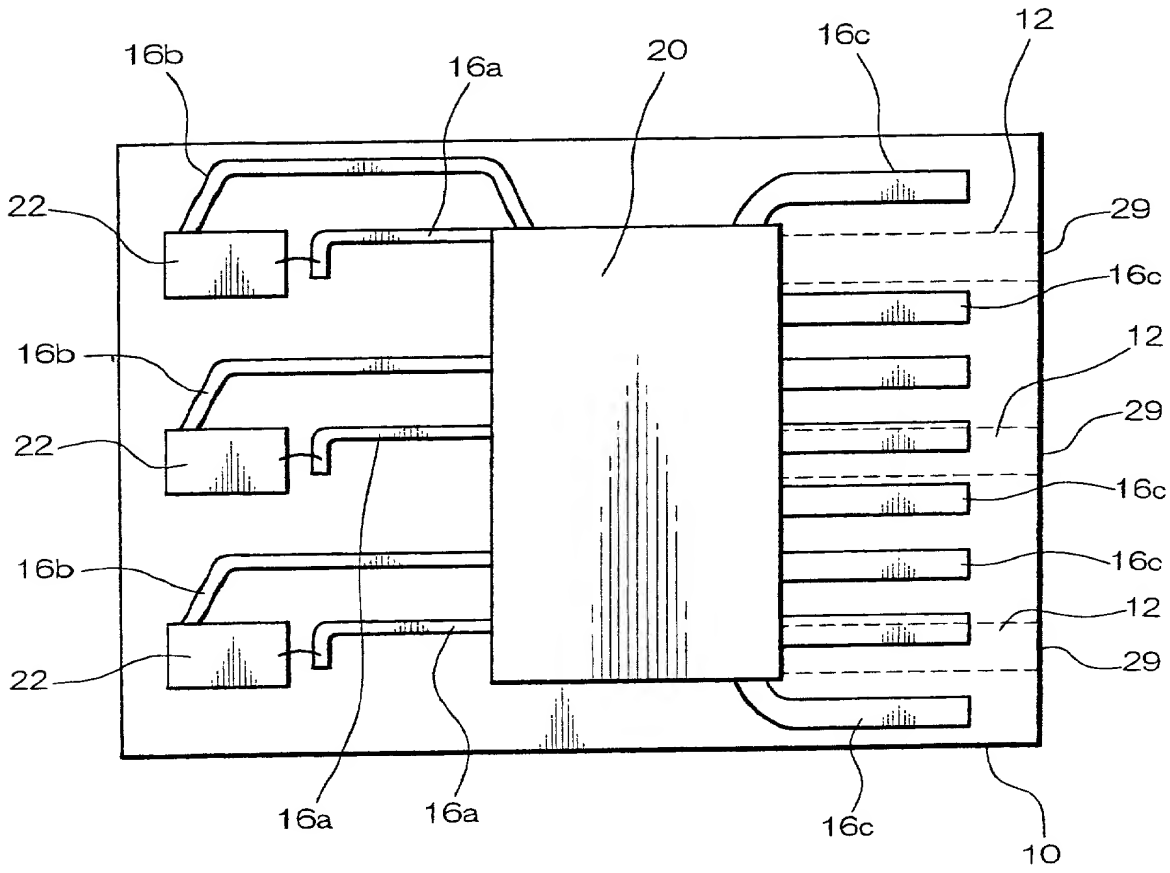
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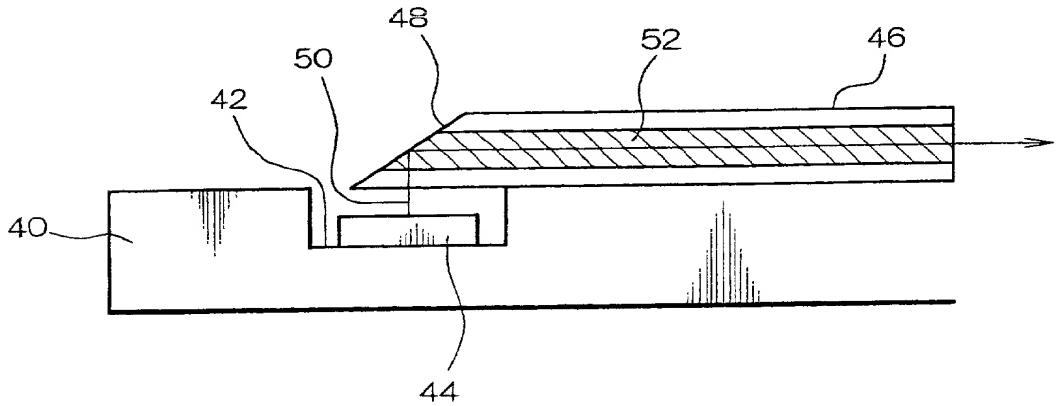
FIG. 3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EPUS-1966

PTO/SB/106 (8-96)
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Seiko Epson Ref. No.: F004518US00 Attorney's Ref. No.:

Declaration and Power of Attorney For Patent Application

特許出願宣言書及び委任状

Japanese Language Declaration

日本語宣言書

下記の氏名の発明者として、私は以下の通り宣言します。

As a below named inventor, I hereby declare that:

私の住所、私書箱、国籍は、下記の私の氏名の後に記載された通りです。

My residence, post office address and citizenship are as stated next to my name.

下記の名称の発明に関して請求範囲に記載され、特許出願している発明内容について、私が最初かつ唯一の発明者（下記の氏名が一つの場合）もしくは最初かつ共同発明者であると（下記の名称が複数の場合）信じています。

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

光モジュール

OPTICAL MODULE

上記発明の明細書（下記の欄で×印がついていない場合は、本書に添付）は、

the specification of which is attached hereto unless the following box is checked:

☒ 1999年7月22日に提出され、米国出願番号または特許協定条約 国際出願番号をPCT/JP99/03927 とし、（該当する場合） _____ に訂正されました。

☒ was filed on July 22, 1999 as United States Application Number or PCT International Application Number PCT/JP99/03927 and was amended on _____ (if applicable).

私は、特許請求範囲を含む上記訂正後の明細書を検討し、内容を理解していることをここに表明します。

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

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I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

PTO/SB/106 (8-96)
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Japanese Language Declaration
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私は、米国法典第３５編１１９条（ａ）-（ｄ）項又は３６５条(ｂ)項に基き下記の、米国以外の国の少なくとも１ヶ国を指定している特許協力条約３６５条(ａ)項に基づく国際出願、又は外国での特許出願もしくは発明者証の出願についての外国優先権をここに主張するとともに、優先権を主張している、本出願の前に出願された特許または発明者証の外国出願を以下に、枠内をマークすることで、示しています。

I hereby claim foreign priority under Title 35, United States Code, Section 119 (a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)
外国での先行出願

Priority Not Claimed
優先権主張なし

(Number) (番号)	(Country) (国名)	(Day/Month/Year Filed) (出願年月日)	☐
10-233608	Japan	05/August/1998	
			☐

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(Application No.) (出願番号)	(Filing Date) (出願日)

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(Application No.) (出願番号)	(Filing Date) (出願日)	(Status: Patented, Pending, Abandoned) (現況：特許許可済、係属中、放棄済)
PCT/JP99/03927	22/July/1999	Pending

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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委任状： 私は、下記の発明者として、本出願に関する一切の手続きを米特許商標局に対して遂行する弁理士または代理人として、下記の者を指名いたします。（弁護士、または代理人の氏名及び登録番号を明記のこと）

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(list name and registration number)*

James A. Oliff, (Reg. 27,075)
William P. Berridge, (Reg. 30,024)
Kirk M. Hudson, (Reg. ~~27,562~~)
Thomas J. Pardini, (Reg. 30,411)
Edward P. Walker, (Reg. 31,450)
Robert A. Miller, (Reg. 32,771)
Mario A. Costantino, (Reg. ~~33,565~~)
Caroline D. Dennison, (Reg.34,494)

書類送付先：
~~OLIFF & BERRIDGE, PLC~~
P.O. Box 19928
Alexandria, Virginia 22320

Send Correspondence to:
OLIFF & BERRIDGE, PLC
P.O. Box 19928
Alexandria, Virginia 22320

直接電話連絡先： (名前及び電話番号)
OLIFF & BERRIDGE, PLC
(703) 836-6400

Direct Telephone Calls to: *(name and telephone number)*
OLIFF & BERRIDGE, PLC
(703) 836-6400

唯一または第一発明者名
村田 昭浩

Full name of sole or first inventor
Akihiro MURATA

発明者の署名 村田 昭浩 日付 2000年3月17日

Inventor's signature Akihiro MURATA Date 3-17-2000

住所 日本国, 山梨県, 高根町

Residence TAKANE-cho, YAMANASHI-ken, Japan

国籍
日本

Citizenship
Japan

私書箱
392-8502 日本国長野県諏訪市大和3丁目3番5号
セイコーエプソン株式会社内

Post Office Address
c/o Seiko Epson Corporation
3-5, Owa 3-chome, Suwa-shi, Nagano-ken 392-8502 Japan

第二共同発明者
北村 昇二郎

Full name of second joint inventor, if any
Shojiro KITAMURA

第二共同発明者の署名 北村 昇二郎 日付 2000年 3月17日

Second inventor's signature Shojiro KITAMURA Date 3.17.2000

住所 日本国, 長野県, 富士見町

Residence FUJIMI-cho, NAGANO-ken, Japan

国籍
日本

Citizenship
Japan

私書箱
392-8502 日本国長野県諏訪市大和3丁目3番5号
セイコーエプソン株式会社内

Post Office Address
c/o Seiko Epson Corporation
3-5, Owa 3-chome, Suwa-shi, Nagano-ken 392-8502 Japan

(第三以降の共同発明者についても同様に記載し、署名をすること)

(Supply similar information and signature for third and subsequent joint inventors.)